

Department of Engineering Professional Development

432 North Lake Street Madison, Wisconsin 53706

Nonprofit
Organization
U.S. Postage
PAID
University of
Wisconsin

What's Next *Starts Now*

Introduction to Food Chilling and Freezing

June 20 – 22, 2018 • Madison, Wisconsin

HANDS ON COURSE!

Practical information for:

- Food engineers
- Refrigeration engineers and supervisors
- Engineering managers with refrigeration responsibilities
- Newly assigned food science staff and others



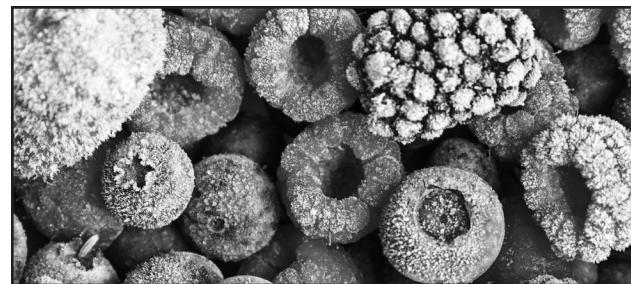
Introduction to Food Chilling and Freezing

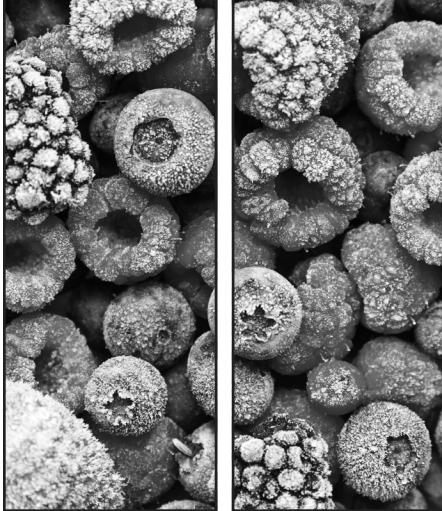
June 20 – 22, 2018 • Madison, Wisconsin

HANDS ON COURSE!

Practical, fundamental information on:

- Product temperature control for quality and safety
- Processes and equipment for chilling and freezing foods
- Techniques to enhance systems capacity and efficiency





Introduction to Food Chilling and Freezing

June 20 – 22, 2018 ▪ Madison, Wisconsin

Focus on Principles and Practices

This course is your opportunity to focus on the most important principles and practices of food chilling and freezing, two key operations integral to the vast majority of food consumed around the world. Chilling and freezing are widely recognized as two critical unit operations to enhance product safety and minimize degradation in product quality. Your participation in this course will help you ensure the quality and safety of your products.

Course Objectives

Attend this course and gain a solid understanding of:

- The importance of product temperature control for quality and safety
- Fundamental processes involved in both chilling and freezing foods
- Equipment commonly used in chilling and freezing foods
- Techniques to enhance capacity and efficiency of chilling and freezing systems
- Methods to predict food chilling and freezing times

Key Topics

- Fundamentals of food thermal processes
- Chilling equipment and technology
- Refrigeration systems review
- Food chilling and chilling time prediction
- Freezing equipment and technology
- Food freezing and freezing time prediction
- Enhancing freezing systems performance
- Principles of moisture loss from products

Earn Continuing Education Credit

By participating in this course, you will earn 20 Professional Development Hours (PDH) or 2.0 Continuing Education Units (CEU).

Who Will Benefit

This course has been specially designed for those needing a better understanding of both the science and technologies for food chilling and freezing. Those who will attend this course include:

- Food engineers who need an introduction to chilling and freezing
- Refrigeration engineers and supervisors
- Engineering managers with refrigeration responsibilities
- Newly assigned food science staff
- Other technical staff wanting to further their understanding of the principles and practices of food chilling and freezing

Instructor Information

Donald J. Cleland is a professor at the Institute of Technology and Engineering of Massey University, New Zealand. Professor Cleland is internationally recognized for his work in modeling of food chilling and freezing processes.

Scott A. Rankin is a professor and chair of the Department of Food Science at the University of Wisconsin-Madison. He chairs or co-chairs more than a dozen extension programs covering dairy-related topics that range from production to manufacturing. His research has focused on the characterization of dairy food flavors with sensory and instrumental techniques.

Todd B. Jekel is assistant director of the Industrial Refrigeration Consortium at the University of Wisconsin-Madison. Dr. Jekel conducts research in the area of industrial refrigeration, including equipment and technologies for food chilling and freezing.

Douglas T. Reindl is a professor in the Department of Engineering Professional Development and director of the Industrial Refrigeration Consortium, University of Wisconsin-Madison. He has expertise in industrial refrigeration systems and technologies.



Introduction to Food Chilling and Freezing

June 20 – 22, 2018 ■ Madison, Wisconsin

Course Outline

Day 1

Course Introduction and Objectives

Douglas T. Reindl, PhD, PE

*Professor, Engineering Professional Development
Director, Industrial Refrigeration Consortium (IRC)*

University of Wisconsin–Madison

Fundamentals of Food Thermal Processes

- Food preservation alternatives
- Evolution of the cold chain
- Microbiology considerations
- Quality considerations

*Scott A. Rankin, PhD
Professor, Food Science
University of Wisconsin–Madison*

Review of Refrigeration Systems

- Refrigerant pressure-temperature relationships
- Refrigerant phases and behavior during phase change
- Basic system components
- Achieving low temperatures: mechanical refrigeration and cryogenic freezing

Douglas T. Reindl

Chilling Equipment and Technology

- Air-based chilling methods
- Water and brine-based chilling methods
- Evaporation-based chilling
- Applications
 - fruits and vegetables
 - meats
 - poultry
- Considerations for increasing chilling capacity
- Considerations for increasing chilling efficiency

Todd B. Jekel, PhD, PE

Assistant Director

*Industrial Refrigeration Consortium (IRC)
University of Wisconsin–Madison*

Day 2

Food Chilling and Chilling Time Prediction

- Factors affecting chilling
- Predicting thermal properties of food products
- Overview of chilling time models
- Simplified chilling time prediction models
- Example

*Donald J. Cleland, PhD
Professor and Head
Institute of Technology and Engineering
Massey University, New Zealand*

Food Chilling Time Prediction Workshop

Freezing Equipment and Technology

- Mechanical freezing systems
- Brine-based freezing systems
- Cryogenic freezing systems
- Hybrid freezing systems
- Applications
 - vegetables
 - meat and poultry
 - prepared products

Douglas T. Reindl

Food Freezing and Freezing Time Prediction

- Overview of the science of food freezing
- Models of freezing processes
- Factors affecting freezing time
- Example
- Cryogenic freezing
 - estimating freezing time
 - potential impacts on food properties
 - costs compared to mechanical freezing

Douglas J. Cleland

Assign Freezing Time Prediction Homework

Day 3

Review Freezing Time Prediction Homework

Enhancing Freezing Systems Performance

- Minimizing parasitic loads
- Infiltration: measurement and reduction
- Improving air flow
- Latent loads and defrost improvement
- Condensation considerations and condensation controls

Douglas T. Reindl

Principles of Moisture Loss from Products

- Mechanisms of weight loss
- Factors that influence weight loss: air velocity, air temperature, packaging, other
- Techniques for reducing or controlling product weight loss

Donald J. Cleland

Discussion

Final Adjournment

Industrial Refrigeration Consortium (IRC)

The IRC, a collaborative effort between the University of Wisconsin–Madison and industry, offers its members practical refrigeration information and application-oriented research, a telephone hotline, Internet-based information resources, on-site technical assistance, and specialized publications. To learn more, check the IRC Web site at www.irc.wisc.edu, email IRC director Douglas Reindl, dreindl@wisc.edu, or phone toll free 866-635-4721.



Enroll Today!

Internet:

epd.wisc.edu/RA00977

Phone:

800-462-0876 or 608-262-1299 (TDD 265-2370)

Fax:

800-442-4214 or 608-265-3448

Mail to:

The Pyle Center, Attn: Engineering Registration
702 Langdon Street
Madison, Wisconsin 53706

Course Information

To enroll, or for complete course schedule, instructor biographies, cancellation policies, discounts and other information, visit epd.wisc.edu/RA00977.

Please enroll me in

- Introduction to Food Chilling and Freezing Course #T278** June 20 – 22, 2018 in Madison, Wisconsin
Fee \$1395
- I cannot attend at this time, please send me brochures on future courses.

Personal Information (Please print clearly.)

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Phone (_____.) _____

Email _____

Billing Information

- Bill my company P.O. or check enclosed (Payable in U.S. funds to UW-Madison)
- MasterCard VISA American Express

Cardholder's Name _____

Card Number _____

Expiration Date _____

Schedule

Registration and course will be held at:

Pyle Center
702 Langdon Street
Madison, WI

Day 1

8:00 a.m. to 8:30 a.m. Registration
8:30 a.m. to 5:00 p.m. Class

Day 2

8:00 a.m. to 8:30 a.m. Coffee and conversation
8:30 a.m. to 5:00 p.m. Class

Day 3

8:00 a.m. to 8:15 a.m. Coffee and conversation
8:15 a.m. to 2:00 p.m. Class

Have Questions?

Call toll free 800-462-0876 and ask for

Program Director: Douglas T. Reindl
dreindl@wisc.edu, 608-262-6381

Program Support: Christine Congdon
christine.congdon@wisc.edu, 608-890-0866

or email custserv@epd.wisc.edu

General Information

Fee Covers Notebook, course materials, break refreshments, lunches, and certificate.

Cancellation If you cannot attend please notify us at least seven days prior to the course start, and we will refund your fee. Cancellations received after that date and no-shows are subject to a \$150 administrative fee per course. You may enroll a substitute at any time before the course starts.

Location This course will be held at the Pyle Center, 702 Langdon Street, Madison, WI.

Accommodations

The Madison Concourse Hotel and Governor's Club

(rates starting at \$136/night)

800-356-8293 or 608-257-6000

Group code: 685959

Room requests after 5/26/2018 will be subject to availability.